

**NBCI****National Biological Control Institute**

Cooperative Agreements and Grants Awarded, 1990-1999

☆☆☆☆☆ Celebrating 10 Years of Service ☆☆☆☆☆
To the Biological Control Community

The National Biological Control Institute (NBCI) was established in 1990 by the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS) as part of USDA's commitment to biological control and integrated pest management.

NBCI's mission "...to promote, facilitate and provide leadership for biological control" is fostered by partnerships with other Federal agencies, State and local governments, international organizations, universities, and non-profit organizations through three NBCI Cooperative Agreement/Grant Programs:

- Facilitation Cooperative Agreement/Grant Program ■
- Implementation Cooperative Agreement/Grant Program ■
- Post Doctoral Fellowship in Systematics Cooperative Agreement/Grant Program ■

Funded activities include:

Facilitation and Implementation – 75 Programs
Post Doctoral Fellowships in Systematics – 16 Programs
Education Information – 30 Programs
Meetings and Symposia – 40 Programs
Monitoring, Evaluations, and Economics – 30 Programs
Publications – 24 Programs
Database Development and Management – 24 Programs
International Activities – 15 Programs
Regulatory Issues – 2 Programs

Between 1990 and 1999 NBCI has assisted over 250 Programs, for a total funding of about \$3,225,000.

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NBCI Cooperative Agreements and Grants

Program Descriptions



Biological Control Facilitation Cooperative Agreement/Grant Program:

The NBCI Facilitation Cooperative Agreement/Grant offers Federal financial assistance to cooperators to facilitate information, education, or communication needs of the biological control community. Specifically, funded projects in this category have included facilitating biological control meetings and symposia, conducting project cost/benefit analysis, developing training materials, producing publications, establishing database and computer systems, and studying and reporting on regulatory issues.

Requests for Proposals (RFP's) are usually issued in the fall and are available "on-line" through NBCI's home page. Most funding available under this Program is allocated to *proposals at or below \$5,000 with the maximum single award normally not exceeding \$10,000.*

Biological Control Implementation Cooperative Agreement/Grant Program:

The NBCI Implementation Cooperative Agreement/Grant Program offers Federal financial assistance to cooperators to implement field biological control projects. Entities receiving funding under this Program are expected to form partnerships to increase and improve the effectiveness of their biological control programs. It is generally assumed that any partnership under this Program will include at least a State agency or associated instrumentality such as a university.

RFP's are usually issued in the fall and are available "on-line" through NBCI's home page. Most funding available under this Program is allocated to *proposals at or below \$15,000 with the maximum single award normally not exceeding \$25,000.*

Post-Doctoral Fellowships in Systematics:

The NBCI Post-Doctoral Fellowships in Systematics Cooperative Agreement/Grant Program offers Federal financial assistance to support Post-Doctoral Fellows to conduct studies in systematics of organisms of critical importance to biological control of agricultural and environmental pests.

RFP's are usually issued annually in the fall and are available "on-line" through NBCI's home page. Most funding available under this Program is allocated to *proposals at or below \$40,000.*

NBCI Cooperative Agreements/Grants Programs

A HISTORICAL PERSPECTIVE --- 1990-1999

<i>Fiscal Year</i>	<i>No. of Projects Funded</i>	<i>Funding Amount this Fiscal Year</i>	<i>Average Funding per Grant/Coop. Agmt.</i>
1990	17	\$ 237,932	\$ 13,996
1991	25	\$ 457,751	\$ 16,954
1992	15	\$ 167,650	\$ 11,177
1993	15	\$ 148,349	\$ 10,596
1994	24	\$ 345,938	\$ 14,414
1995	30	\$ 334,840	\$ 11,161
1996	14	\$ 192,859	\$ 13,776
1997	34	\$ 356,132	\$ 10,474
1998	44	\$ 515,283	\$ 11,711
1999	36	\$ 472,054	\$ 13,113

Total Amount of Grant/Coop. Agreement Funding --- 1990-1999: \$3,232,288

Total Number of Grants/Coop. Agreements Funded --- 1990-1999: 256

Average Funding Amount Per Grant/Coop. Agmt. --- 1990 -1999: \$ 12,626

FACILITATION & IMPLEMENTATION PROGRAMS

Total Funding to Date --- \$ 1,099,090

- Antilla, L., J. Gould, and T. Dennehy. 1998. Integrating biological control and IPM approaches in area-wide management of *Bemisia argentifolii* (= *B. tabaci* strain B) in melons and cotton. Arizona Cotton Research Council, Tempe, AZ.
- Bennett, F.D. 1990-1991. Investigations on black parlatoria scale in Puerto Rico. University of Florida, Gainesville, FL.
- Bennett, F.D. 1991. Biological control of Russian wheat aphid. University of Florida, Gainesville, FL.
- Blossey, B. and L. Skinner. 1998. *Hylobius transversovittatus* mass production. Cornell University, Ithaca, NY.
- Brown, J.K. 1999. Molecular variation between mealybug species by mitochondrial COI sequence analysis, and species-specific molecular diagnosis for identification and tracking. University of Arizona, Tucson, AZ.
- Bryan, M.D. 1991. Biological control of euonymus scale. USDA, APHIS-PPQ, Niles, MI.
- Callan, N.W. and J.M. Story. 1998. Enhancement of Insect-mediated Biological Control of Spotted Knapweed by Plant Pathogens. Western Agricultural Research Center, Corvallis, OR.
- Casagrande, R.A. 1997. "Biological Control in the Northeast: Purple Loosetrife and Cypress Spurge." University of Rhode Island, Kingston, RI.
- DeLoach, J.C. 1997. Develop methods/agents to implement Saltcedar biological control. U.S. Dept. of Agriculture, ARS, Temple, TX.
- Dunley, J. and R. Miller. 1997. Augmentative release of green lacewings, *Chrysoperla rufilabris*, to control grape mealybug, *Pseudococcus maritimus*, on pear. Washington State University, Pullman, WA.
- Dysart, R. 1990. Biological Control of grasshoppers. USDA, ARS, Sydney, MT.
- Eggen, D. 1996. Biological Control Project for Purple Loosetrife in Delaware. Delaware Department of Agriculture.
- Ellington, J. 1995. Documentation of biological control of pecan aphid complex in southern New Mexico. New Mexico State University.
- Elliot, M.L., M.B. Payachherty, and F. Laroche. 1997. Integration of a fungal pathogen with current methods of *Melaleuca* control in south Florida. University of Florida, Fort Lauderdale Research and Education Center, Fort Lauderdale, FL.
- Ellis, D., R.A. Ashley, and D. Askew. 1998. *Galerucella californiensis* and *G. pusilla* as biological control agents for purple loosetrife (*Lythrum salicaria* L.). University of Connecticut, Storrs, CT.
- Flanders, K.L., D.C. Buntin, G. Comeaux, and R. McDonald. 1997. Establishment of classical biological control agents for management of cereal leaf beetle in Alabama and Georgia. Auburn University, Auburn, AL.
- Gaugler, R., F. Yoder, and E. Lewis. 1996. Development of Inoculative Release Strategies for Entomopathogenic Nematodes Against White Grubs. Rutgers University, New Brunswick, NJ.
- Gilstrap, F. 1991. Biological control of Russian wheat aphid. Texas A&M University, College Station, TX.
- Gonzalez, D. 1991. Biological control of Russian wheat aphid. University of California, Riverside, CA.
- Greany, P., A. Cohen, and C. Rihard. 1997. Microencapsulation of artificial diets for entomophagous insects and predacious mites. USDA, ARS, Gainesville, FL.
- Groden, E. and D. Vacek. 1997. Implementation of an integrated biological control program for the Colorado potato beetle on commercial farms in Maine. University of Maine, Orono, ME.
- Hagler, J.R., C.G. Jackson, and T. Dennehy. 1999. Validation of a novel protein marker for a parasitoid of the silverleaf whitefly. USDA, ARS, Phoenix, AZ.
- Heinz, K.M. 1997. Improvement of parasitoid sex ratios within commercial mass-rearing programs. Texas A&M University, College Station, TX.

- Hinote, H., R. Sutter, S. Schlarbaum, K. Seaton, and J. Clark. 1996. "Facilitating Biological Control through Cooperation in Southern Appalachia: A regional management approach." Southern Appalachian Man and the Biosphere Program, Gatlinburg, TN.
- Holtzer, T. 1991. Biological control of Russian wheat aphid. Colorado State University, Fort Collins, CO.

FACILITATION & IMPLEMENTATION PROGRAMS: (continued)

- Hoover, K. 1999. Biological control of Asian longhorned beetle. Pennsylvania State University, University Park, PA.
- Hoy, M. 1995. Facilitating classical biological control of the citrus leafminer. University of Florida, Gainesville, FL.
- Johnson, J. 1991. Development of artificial diets for aphid predators. University of Idaho, Moscow, ID.
- Kim, K.C. 1993-1995. North American Immigrant Insects and Arachnids: Pathways and Consequences. Pennsylvania State University.
- Klepinger, M. and D. Landis. 1998. The Purple Loosetrife Project at MSU. Michigan State University, East Lansing, MI.
- Kinsley, P., W.C. Kauffman, V. Nealis, R. Fuester, and R. McDonald. 1997. New initiatives in Gypsy moth biological control. USDA, ARS, Greenbelt, MD.
- Knudson, A. and J. DeLoach. 1998. Establishing a Nursery for Rearing the Saltcedar Leaf Beetle for Biological Control of Saltcedar in Texas. Texas A&M University, College Station, TX.
- Kok, L.T. 1998. Establishing and maintaining field nurseries of *Trichosiocalus horridus* for biological control of musk and plumeless thistles. Virginia Polytechnic Institute and State University, Blacksburg, VA.
- Kovach, J. and F. Wiles. 1997. Using bees to disseminate *Trichoderma harzianum* for the biological control of *Botrytis* fruit rot in strawberries. Cornell University, NY State Agricultural Experiment Station, Geneva, NY.
- Lagasa, E. 1990. Biological control of winter moth. Washington State Department of Agriculture, Olympia, WA.
- Lambdin, P. 1991. Evaluation of predators and parasitoids for mass release against scale insects and cereal leaf beetle. University of Tennessee, Knoxville, TN.
- Landis, D., M. Klepinger, P. Squibb, and K. Rauscher. 1998-1999. The Purple Loosetrife Project at MSU: Implementation and Strengthening the Network. Michigan State University, East Lansing, MI.
- Lindegren, J. 1990. Evaluation of medfly suppression in coffee plantings. USDA, ARS, Fresno, CA.
- Littlefield, J. and R. Sobhian. 1998. Biological Control of Russian Knapweed - Survey and Host Specificity Testing of New Agents. Montana State University, Bozeman, MT.
- Lym, R.G., C.S. Fugere, and J.A. Nelson. 1998. Introduction and Redistribution of Biological Agents for Control of Purple Loosetrife (*Lythrum salicaria* L.) in North Dakota. North Dakota State University, Fargo, ND.
- Mahlberg, P. 1991. Identification of chemotypes of leafy spurge in the United States and Europe. Indiana University, Bloomington, IN.
- Mason, C.E., R.N. Wiedenmann, and R.W. Fuester. 1997. Importation and release of *Cotesia ruficrus* to improve biological control of European corn borer. University of Delaware, Newark, DE.
- McCullough, D.G. 1997. Biological control of insect pests in forestry, Christmas tree plantations, and urban forests in the north central United States. Michigan State University, East Lansing, MI.
- McCutcheon, G., A.M. Simmons, J.P. Smith, and B.M. Sheppard. 1998. Areawide Management of Diamondback Moth and Sweetpotato Whitefly in South Carolina with Introduction of Parasitoids. Clemson University, Charleston, SC.
- Metterhouse, W.W. 1990. NBCI Implementation Plan. NJ Department of Agriculture, Trenton, NJ.
- Miller, T.A., N. Toscana, R.T. Staten, and R. Roberson. 1997. "ABC- Autocidal Biological Control:



- Development of a New Biological Control System. University of California, Riverside, CA.
- O'Brien, C.W. Biological Control of *Hydrilla verticillata*. Florida A&M University, Tallahassee, FL.
- O'Brien, C.W and E.T. Schreiber. 1997-1999. Florida A&M University Biological Control Program Implementation.. Florida A&M University, Tallahassee, FL.
- Obrycki, J.J., G. Kristopher, and E. Derrick. 1997. Conservation and enhancement of the fungal entomopathogens *Zoophthora phytonomi* and *Z. radicans* in alfalfa using an alternative harvesting technique. Iowa State University, Ames, IA.

FACILITATION & IMPLEMENTATION PROJECTS: (continued)

- Obrycki, J.J., A.B. Cortilet, R. Klann, and M. Schutt. 1998. Expansion of current rearing operations for two natural enemies of Purple Loosetrife (*Lythrum salicaria* L.) in Iowa. Iowa State University, Ames, IA.
- Oleson, A.E., J.R. Gould, D.C. Vacek, M.A. Ciomperlik, and D.R. Nelson. 1999. Detection of specific parasitoids of silverleaf whitefly with satellite DNA probes: A project to facilitate delivery of a biological control program. North Dakota State University, Fargo, ND.
- Parrella, M.P. 1998. Integration of Fungal Pathogens and Natural Enemies for the Biological Control of the Sweet Potato Whitefly (*Bemisia tabaci*) in Greenhouse Poinsettias. University of California at Davis, Davis, CA.
- Pena, J.E. 1997. Biological control of the borer weevil *Diaprepes abbreviatus* eggs by the parasitoid *Ceratogramma etiennei* (Trichogrammatidae). University of Florida, Tropical Research and Education Center, Homestead, FL.
- Pereira, R.M., K.M. Vail, S.D. Porter, C.M. Mannion, W.G. Haun, and T.D. Crowe. 1999. Field release of phorid flies for biological control of imported fire ant in Tennessee. University of Tennessee, Knoxville, TN.
- Porter, S., W. Tschinkel, S. Diffie, H. Collins, and L. Thompson. 1998. Field release of Phorid Flies for Biological Control of Imported Fire Ants in the United States. USDA, ARS, Gainesville, FL.
- Quimby, P. 1990. Biological control of leafy spurge. USDA-ARS-NPA, Bozeman, MT.
- Ragsdale, D.W., R.L. Becker, and E.S. Katovich. 1998. Biological Control of Purple Loosetrife – Cooperator Rearing Program. University of Minnesota, St. Paul, MN.
- Rankin, M.A. 1990. Development of a diapause prediction system for the boll weevil. The University of Texas, Austin, TX.
- Raupp, M. 1990. Rearing, distribution, and evaluation of *Chilocorus kuwanae*, an exotic coccinellid predator of the euonymous scale. University of Maryland, College park, MD.
- Rose, M., K. Hoelmer, C. Pickett, and R. Nguyen. 1998-1999. Identification of *Eretmocerus* spp. Ex: *Bemisia*. Montana State University, Bozeman, MT.
- Sadof, C.S. 1999. Volunteer research on biological control in home gardens and landscapes. Purdue University, West Lafayette, IN.
- Staten, R. 1991. Mass production of *Geocoris punctipes* and *G. pallens*. USDA, APHIS/S&T, Phoenix, AZ.
- Stauffer, S. 1999. Conservatory biointensive IPM. Chicago Park District, Chicago, IL.
- Stoner, K.A., L. Warren, T. Norris, and S. Dorsey. 1998. Feasibility of Cooperative Purchase and Inoculative Release of *Pediobius foveolatus* in Gardens and Small Organic Farms. Connecticut Department of Agriculture, New Haven, CT.
- Taylor, R. and R.C. McDonald. 1998. Sustainable suppression of the Japanese beetle by the parasitoid *Tiphia vernalis* using a geographic information system to identify field insectaries and coordinate distribution efforts. Ohio Agricultural Research Center, Columbus, OH.
- Thorvilson, H. 1990. Preparation and testing of *Beauveria bassiana* dry mycelia for imported fire ant control in containerized nursery stock. Texas Technical University, Lubbock, TX.
- Unruh, T.R., J.F. Brunner, A.L. Knight, and N.J. Mills. 1996. "Rearing and Augmentative Releases of *Colpoclypeus florus* (Hymenoptera: Eulophidae) for Control of Leaf-rollers and Augmentative Release of two Exotic Parasitoids of the Codling Moth in an Area-wide

Management Project". USDA, ARS and Washington State University, Wapata, WA.

- Wendel, L. 1990-1991. Biological control of sweet potato whitefly. USDA, APHIS/PPQ Biological Control Operations Laboratory, Mission, TX.
- Wendel, L. 1995. Biological control of the boll weevil, *Anthonomus grandis*, in environmentally sensitive areas by augmentative release of *Catolaccus grandis*. USDA, APHIS/PPQ Biological Control Operations Laboratory, Mission, TX.

POST-DOCTORAL FELLOWSHIPS IN SYSTEMATICS Total Funding To Date --- \$ 600,853

- Bowers, J. 1994-1995. Determination of relationships among suppressive and pathogenic strains of *Streptomyces* for biological control of potato scab. University of Minnesota, St. Paul, MN.
- Evans, G. and H. Browning. 1995-1997. Systematic studies of whitefly (Homoptera: Aleyrodidae) parasitoids of the genus *Encarsia* (Hymenoptera: Aphelinidae). University of Florida, Gainesville, FL.
- Heraty, J.M. 1998-1999. Systematics of the genus *Encarsia* (Hymenoptera: Aphelinidae). University of California at Riverside, Riverside, CA.
- Inglis, G.D. 1999. Molecular systematics of the entomopathogenic fungal genus *Nomuraea*. Mississippi State University, Mississippi State, MS.
- O'Brien, C.W. and P. Kovarik. 1998-1999. Classification of Diaprepes Root Weevils in Support of Biological Control. Florida A&M University, Tallahassee, FL.
- Schauff, M. and J.M. Heraty. 1994-1995. Biosystematic studies of the *Strenua* group of *Encarsia*. USDA, ARS-Systematic Entomology Laboratory, Beltsville, MD.
- Vandenberg, N. and P. Marsh. 1994-1995. A systematic study of flea beetles in the genus *Aphthona*, a group important for biological control of leafy spurge. U.S. Dept. of Agric., ARS/SEL, Washington, DC.
- Zolnerowich, G. 1994-1995. Systematics of native and exotic *Eretmocerus* sp., parasitoids of *Bemisia* sp. Texas A&M, College Station, TX.



EDUCATION & INFORMATION Total Funding To Date --- \$ 299,134

- Altieri, M.A. 1998. Developing a biological control manual and farmer to farmer training program for Hispanic farmers and farm-workers in California. University of California at Berkeley, Berkeley, CA.
- Andrascik, R.J. 1997. "Interpretive Exhibits – Biological Control as an Integrated Pest Management Technique for Leafy Spurge." U.S. Department of the Interior, National Park Service, Theodore Roosevelt National Park, Medora, ND.
- Breth, D.I. and F. Fladd. 1997. "How to Establish Predator Mites for Biological Control of European Red Mites (ERM) in Apple Orchards – A Bulletin for Implementation." Cornell University, Ithaca, NY.
- Ellis, D. 1998-1999. Purple Loosetrife (*Lythrum salicaria*) Biological Control: Increasing Awareness through Educational Outreach. University of Connecticut, Storrs, CT.
- Gibson, P. 1997. "Exotic Introductions: Developing an Educational Strategy for Southern Appalachia." Western North Carolina University, Cullowhee, NC.
- Harris, D. 1992. Broadcast and video of "Predator Insects and Biological Control Management: Learning to Live with the Natural Order." Live Educational Resource Network, Denver, CO.
- Jeffords, M. 1994. Publication of "Pests Have Enemies Too!: Teaching Biological Control to Children. University of Illinois, Champaign, IL.
- Kauffman, B. 1997. Brochure on biological control. USDA, APHIS/PPQ Plant Protection Laboratory, Niles, MI.
- Klatt, A. and P. Jatala. 1995. Production of a bilingual (English/Spanish) International Magazine on Biological Control. Oklahoma State University.

- Knutson, A. 1995. Workshop for Training Extension Entomologists in the Identification and Role of Predators and Parasites Commonly Used in Biological Control. Texas A&M University, College Station, TX.
- Kok, L.T. 1998. Introducing Biological Control to Schools and the General Public. Virginia Polytechnic Institute and State University, Blacksburg, VA.
- Lamp, W.O., G.P. Dively and D.J. Liewehr. 1995. A Multimedia Presentation of Biological Control for Education. University of Maryland, College Park, MD.
- Larkin, T. 1992-1993. NBCI Bulletin Board System technical support. USDA, ARS, Ithaca, NY.

EDUCATION & INFORMATION (continued)

- Lashomb, J. 1994-1995. Development of "An Instructional Video for Biological Control Intensive IPM in Eggplant." Cook College, Rutgers-The State University, New Brunswick, NJ.
- Lor, S.K. 1997. Educational programs to alert the public to the impact of purple loosestrife on ecosystems. U.S. Department of the Interior, Fish and Wildlife Service, Iroquois National Wildlife Refuge, Alabama, NY.
- Morrill, David. 1999. Promoting awareness of wheat stem sawfly parasitoids. Montana State University, Bozeman, MT.
- Mountain, W. and G. Clement. 1997. Purple Loosestrife Education/Information Brochures in Cooperation with the Pennsylvania Department of Plant Industry. USDA, APHIS, PPQ, Harrisburg, PA.
- O'Brien, C. and E.T. Schreiber. 1997. Feasibility study for a Center in biological control. Florida A&M University, Tallahassee, FL.
- Obyrcki, J.J. 1998. Biological Control Principles for Vocational Agricultural Curriculum. Iowa State University, Ames, IA.
- Obyrcki, J.J. 1998. Midwest Institute for Biological Control: 1998 Summer Workshop. Iowa State University, Ames, IA.
- O'Neil, R.J. 1991 & 1993. Midwest Summer Institute in Biological Control. Purdue University, West Lafayette, IN.
- Pemble, J. 1993. Biological Control Video. USDA, ARS, OPA, Washington, DC.
- Shelton, A. 1996. Biological Control on the World Wide Web. Cornell University, Ithaca, NY.
- Stinner, R. 1996. "Integrating Biological Control Information with the National IPM Network." North Carolina State University, Raleigh, NC.
- Wiedenmann, R.N. and J.V. Maddox. 1995. Curriculum Development for the Midwest Institute for Biological Control. University of Illinois, Champaign, IL.
- Wiedenmann, R.N. 1997. International training short course in biological control. University of Illinois, Champaign, IL.
- Zack, R.S. 1998. Display Presentations and Development of Biological Control Organism Resources. Washington State University, Pullman, WA.

MEETINGS & SYMPOSIA Total Funding To Date --- \$ 187,775

- Birdsall, S. 1994. "The Fifth Annual Biological Pest Control Conference", 16-17 November 1993, El Centro, California. Imperial County Agricultural Commissioner's Office, El Centro, CA.
- Burton, R. 1990. "Symposium On Aphids, Their Hosts, and Their Natural Enemies", 12-17 August 1990, Stillwater, OK. USDA, ARS/Plant Science and Water Conservation Laboratory, Stillwater, OK.
- Currie, W.E. and M. Burt. 1998-1999. Facilitate information exchange of identified needs of agricultural users and commercial producers of biological control organisms. The Association of Natural Bio-Control Producers (ANBP), Santa Ana, CA.
- Dahlsten, D. and K. Raffa. 1994. "Symposium on natural Enemies and Biological Control of Bark Beetles", 18-21 October 1993, University of California, Berkeley, CA. University of Wisconsin, Madison, WI.
- Epstein, A. 1994. "International Symposium on Rose Rosette Disease and other Eriophyid Mite-Disease Agents", 6-7 May 1994, Iowa State University, Ames, IA.

- Hoebeke, R.E. 1996. Eastern Branch ESA Symposium: "Biological Control of Weeds." Cornell University, Ithaca, NY.
- Hoelmer, K.A. Evaluating Indirect Ecological Effects of Biological Control: A Symposium and Workshop – AGROPOLIS, USDA, ARS, EBCL, Montpellier, France.
- Hoy, M. 1996. International Conference: "Managing the Citrus Leafminer." University of Florida.
- Gaugler, R. and H.K. Kaya. 1995. Symposium on Technological Advances with Entomopathogenic Nematodes as Vectors of Bacteria. Rutgers University, NJ, and University of California, Davis, CA.
- Gaugler, R. 1997-1998. Alternative paradigms for biopesticides. Rutgers University, New Brunswick, NJ.

MEETINGS & SYMPOSIA: (continued)

- Kimsey, L.S. 1995. Third International Society of Hymenopterists Conference. University of California, Davis, CA.
- Kring, T. 1997. Facilitate the International Organization for Biological Control (IOBC) Symposium held at the National Entomological Society of America (ESA) Meeting. University of Arkansas, Fayetteville, AR.
- Kring, T. 1999. Conference – IOBC: Biological Control in Insect and Pathogen Systems. University of Arkansas, Fayetteville, AR.
- Luck, R. 1995. International Organization for Biological Control Global Working Group Meeting on Quality Control of Mass-Reared Arthropods. University of California, Riverside, CA.
- Lumsden, R.D. and G.J. Samuels. 1995. "Fifth International *Trichoderma/Gliocladium* Workshop". USDA, Beltsville, MD.
- Lumsden, R.D. 1996. "International Symposium/Workshop on *Fusarium* species as Biological Control Agents. USDA, ARS, Beltsville, MD.
- McManus, M. 1996-1999. USDA Interagency Gypsy Moth Research Forum. USDA, FS.
- Messing, R. 1998. Organizing the W-185 Biological Control Conference. University of Hawaii, Honolulu, HI.
- Nordund, D. 1993. "Worldwide outreach for Biological Control of Whiteflies (Aleyrodidae)", 6-11 December 1992, Baltimore, MD. USDA, ARS/SARL, Weslaco, TX.
- Nordlund, D. 1998. Joint *Bemisia-Gemini* Virus International Workshop. USDA, ARS, Mississippi State, MS.
- Obyrcki, J. 1995. International Organization for Biological Control Technology Transfer Conference. Iowa State University, Ames, IA.
- Obyrcki, J. 1996. International Organization for Biological Control – Conference. Iowa State University, Ames, IA.
- Parker, B. 1993. "The 1993 International Conference on *Thysanoptera*: Towards Understanding Thrips Management", 28-30 September 1993, University of Vermont, South Burlington, VT.
- Rendon, P. 1999. Workshop on Parasitoid Rearing and Biological Control of Fruit Flies. USDA, APHIS, International Services. Guatemala City, Guatemala.
- Rose, M. and S. Stauffer. 1994. "Biological Control in Artificial Ecosystems", 15-18 June, 1994, Huntington Gardens, CA. Texas A&M University, College Station, TX.
- Rosenheim, J.A. 1999. 12th International Entomophagous Insects Workshop. University of California at Davis, Davis, CA.
- Rypstra, A.L. 1998. Symposium: Spiders in Agroecosystems, Ecological Process and Biological Control. Miami University, Oxford, OH.
- Shelton, A.M. and M.P. Hoffmann. 1995. Cornell Community Conference on Biological Control. Cornell University, Ithaca, NY.
- Soper, R.S. 1991. ARS Workshop on "Biological Control Quarantine: Needs and Procedures", January 1991, Baltimore, MD. USDA, ARS/NPS, Beltsville, MD.
- Soper, R.S. 1995. First International Workshop on Transgenesis of Invertebrates of Medical, Agricultural and Aquacultural Importance." USDA, Beltsville, MD.
- Stimman, M. 1998. 1st California Conference for Biological Control. University of California at Davis, Davis, CA.
- Van Driesche, R., E.R. Hoebeke and A.G. Wheeler. 1995. Symposium, Using Biological Control While Protecting Non-Target Species: Finding the Middle Ground. University of Massachusetts, Amherst, MA, Cornell University, Ithaca, NY, and the Pennsylvania Department of Agriculture.

- Wedberg, J. and D.L. Mahr. 1994. "Biological Control Workshop for Pest Managers." University of Wisconsin, Madison, WI.
- Wendel, L. 1996. Biological Control Based technologies Symposium. USDA, APHIS, PPQ, Mission, TX.
- Wright, R. 1995. North Central Extension Biological Control of Insects Conference. University of Nebraska, Lincoln, NE.

MONITORING, EVALUATIONS, & ECONOMICS

Total Funding To Date --- \$ 374,303

- AliNiazee, M.T., S. Sarwar, and S. Morgan. 1997. "Economic and Environmental Impact Assessment of a Classical Control Program Against the Filbert Aphid *Myzocallis corylii* using *Trioxys palludus* in Oregon." Oregon State University, Corvallis, OR.
- Barbosa, P. 1997. Publication of guidelines for evaluating the status and prospects of biological control on a Statewide basis. University of Maryland, College Park, MD.
- Blossey, B., D. Eberts, P. McEvoy, and E. Coombs. 1997. Development of a standardized nationwide monitoring plan to evaluate establishment and impact of biological control agents released against purple loosestrife *Lythrum salicaria*. Cornell University, Ithaca, NY.
- Braxton, S., A. Segarra-Carmona, and P. Barbosa. 1990. "Guidelines for Evaluating the Status and Prospects of Biological Control on a Statewide Basis." University of Maryland, College Park, MD, 116 p.
- Braxton, S., A. Segarra-Carmona, and P. Barbosa. 1991. "Biological Control in Maryland: Status, Prospects, and Recommendations for the Future." University of Maryland, College Park, MD. 187 p.
- Carson, W.P., W. Mountain, and D. Bunker. 1999. Evaluation of *Galerucella* and *Hylobius* on purple loosestrife (*Lythrum salicaria*) at varying levels of site productivity: Combining observational and experimental approaches. University of Pittsburgh, Pittsburgh, PA.
- Center, T.D., P.T. Madeira, C. Jacono, and T. Davern. 1999. Evaluation and collection of *Cyrtobagous salviniae* populations in Florida, evaluation of success on *Salvinia molesta* and *S. minima*, and introduction of *C. salviniae* to Louisiana and Texas. USDA, ARS, Ft. Lauderdale, FL.
- Deloach, C.J., I. Mityaev, S. Myartseva, and D. Gerling. 1999. Testing of insects from Asia and shipping them to the U.S. for biological control of saltcedar (*Tamarix*), USDA, ARS, Temple TX.
- Hansen, R.W., R. DeClerk-Floate, and R.M. Nowierski. 1999. Host specificity studies on two potential biological control agents of Dalmatian and yellow toadflax in North America. USDA, APHIS, Bozeman, MT.
- Kauffman, W.C. 1991. "Development of Sampling Plans for Monitoring Russian Wheat Aphid and Associated Natural Enemies in Small Grains." USDA, APHIS/PPQ Otis Plant Methods Development Center, Otis, MA.
- Kazmer, D.J. and R. Hanson. 1998. Distribution and relative abundance of three immigrant biological control agents on Dalmatian and Yellow Toadflax in Wyoming. University of Wyoming, Laramie, WY.
- Knutson, A. and C.J. Deloach. 1999. Establishment and impact of *Diorhabda elongata* for biological control of saltcedar in the southwest. Texas A&M University, College Station, TX.
- Littlefield, J. and R. Sobhian. 1999. Biological control of Russian knapweed --- Survey and host specificity testing of new agents. Montana State University, Bozeman, MT.
- McKlindon, A. and G. Scriven. 1998-1999. Developing voluntary, full-consensus standards for natural multi-cellular biocontrol organisms through ASTM/ISR. American Society for Testing Materials (ASTM), West Conshohocken, PA.
- Moffit, L.J. 1990. Benefit/Cost Analysis of the USDA's biological control program for the cereal leaf beetle. University of Massachusetts, Amherst, MA.
- Moffit, L.J. and P. Parker. 1999. Economic impact of purple loosestrife in the United States. University of Massachusetts, Amherst, MA.
- Nechols, J.E. 1991. Evaluation of biological control of aphids. Kansas State University, Manhattan, KS.

- Nechols, J.R. 1998. Evaluating nontarget thistle utilization in the flea beetle *Psylliodes chalcamera*. Kansas State University, Manhattan, KS.
- Nowierski, R. 1991-1992. Evaluation of the impact of natural enemies of the Russian wheat aphid. Montana State University, Bozeman, MT.
- Obrycki, J.J. 1992. Analysis of the Quality of Commercially Available Natural Enemies. Iowa State University, Ames, IA.
- Obrycki, J.J., D.L. Mahr and R.J. O'Neil. 1992. Evaluation of the quality of commercially available natural enemies. Iowa State University, Ames, IA, University of Wisconsin, Madison, WI, and Purdue University, West Lafayette, IN, respectively.



MONITORING, EVALUATIONS, & ECONOMICS:

(continued)

- Oi, D.H., D.F. Williams, H. Collins, and S. Duffie. 1999. Evaluation of the biological control agent *Thelohania solenopsae* in multiple and single queen populations of imported fire ants. USDA, ARS, Gainesville, FL.
- Pantoja, A. and M. Ciomperlik. 1999. Evaluation of the establishment and distribution of exotic biological control agents of the silverleaf whitefly in Puerto Rico. University of Puerto Rico, Mayaguez, PR.
- Schroder, R.W., K.W. Thorp, P. Tipping, and H.A. Cordo. 1999. Environmental assessment of *Centistes gasseni* Shaw (Hymenoptera: Brachonidae), a new exotic parasitoid of the *Diabrotica* (Coleoptera: Chrysomelidae) pest complex. USDA, ARS, Beltsville, MD.
- Taylor, M.J., D. Vack, L. Wood, and M. Ciomperlik. 1997. Economic evaluation of biological control projects administered by the Biological Control Center in Mission, TX. Texas A&M University, Weslaco, TX.
- Taylor, D., B. Richard, and D. Kazmer. 1998. Economic Impact of Biological Control of Russian Knapweed. University of Wyoming, Laramie, WY.
- Wheatley, J. and D. Proust. 1994. Quality assurance pilot project for biological control agents. California Polytechnic University, San Luis Obispo, CA.
- Wiedenmann, R.N., D. Voegtlin, W. Schennum, D. Ullberg, and K. Klick. 1997. Establishment of leaf-feeding beetles against purple loosestrife in Illinois. University of Illinois, Champaign, IL.

PUBLICATIONS

Total Funding To Date --- \$ 149,352

- Anderson, T. and N.C. Leppla. 1991. "Advances in Insect Rearing for Research and Pest Management." Studies in Insect Biology Series, Westview Press, Oxford and IBH Publishing Co., New Delhi, India, 519 p.
- Bewick, T.A. 1995. Production of a brochure on biological weed control. Weed Science Society of America.
- Bigler, F. 1991. "Biological Pest Control in North America: Issues and Opportunities." Federal Research Station, Zurich, Switzerland.
- Ellington, J. 1995. "Biological Control of the Pecan Aphid Complex." New Mexico State University, Las Cruces, NM.
- Hagedorn, C. and S. Hagedorn. 1995. Brochure on Public Perceptions of Genetically Engineered Biological Control Products. Virginia Polytechnic Institute and State University.
- Hopper, B. 1990. "International Symposium on Biological Control Implementation; Proceedings and Abstracts." North American Plant Protection Organization, Ottawa, Ontario, Canada.
- Hoy, M. and T. Kostianen. 1994-1995. "Bibliography of the Phytoseiidae (Acari: Mesostigmata)", 1960-1994. University of Florida, Gainesville, FL.
- Humber, R.A. 1993. "Collection of Entomopathogenic Fungal Cultures: Catalog of Strains." USDA, ARS, Ithaca, NY, ARS-110, 177 p.
- Hunter, C.D. 1996. Collecting and developing 1996 data on commercial suppliers of beneficial organisms in North America. California Department of Pesticide Management, Sacramento, CA.
- Mahr, D.L. and S. Mahr. 1994. "Biological Control of Greenhouse Crops." University of Wisconsin, Madison, WI.

- Mahr, D.L. 1995. "Production of an Extension Publication: Biological Control of Insect and Other Pests of Greenhouse Crops." University of Wisconsin, Madison, WI.
- McDonald, R.D., J.D. Harper and W.A. Dickerson, Editors. 1993. "Biological Control: Developing Strategies for the 90's." Proceedings of a National Conference, 8-11 April 1991, Raleigh, NC. Plant Industry Division, Plant Protection Service, North Carolina Department of Agriculture, Raleigh, NC, 79 p. (see McDonald 1993, under "Meetings").
- Nechols, J.R., P.E. Sloderbeck and G.L. Green. 1995. Brochure on Biological Control of Insect Pests on Field Crops and Feedlots in Kansas. Kansas State University.
- Pinto, J.J. 1998. Publishing a Revision of North American *Trichogramma* (Hymenoptera) and Developing an Interactive Key to Species. University of California at Riverside, Riverside, CA.

PUBLICATIONS: (continued)

- Schauff, M.E. 1995. Keys to the Chalcidoid (Hymenoptera) parasites of the citrus leafminer, *Phyllocnistis citrella* (Lepidoptera: Gracillariidae), of the World. USDA, Beltsville, MD.
- Shelton, A.M., C. Weeden, and L. McCandless. 1998-1999. Natural Enemies: A Guide to Biological Control Agents in North America. Cornell University, Ithaca, NY.
- Vandenberg, N. 1993. *Coccinellids* of the Russian Far East. USDA, ARS\SEL, Washington, DC.
- Vandenberg, N. 1994. "A Handbook of Palearctic Flea Beetles (Coleoptera: Chrysomelidae: Alticinae) with Pictorial Keys to the *Aphthona* spp. On Leafy Spurge." USDA, ARS\SEL, Washington, DC.
- Van Driesche, R.G. 1991. Bulletin on Procedures for Classical Biological Control. University of Massachusetts, Amherst, MA.
- Van Driesche, R.G. and J. Van Driesche. 1997. Popular book on exotic species, the damage they do, and the role of biological control. University of Massachusetts, Amherst, MA.
- Van Driesche, R.G. and T.S. Bellows. 1993. "Steps in Classical Arthropod Biological Control. Proceedings of the Thomas Say Publications in Entomology", Entomological Society of America, Latham, MD, 88 p.
- Walla, J. and the Great Plains Agricultural Council. 1993. "Biological Control of Forest Pests in the Great Plains: Status and Needs Symposium." North Dakota State University, Fargo, ND and "Biological Control of Forest Pests in the Great Plains: Status and Needs Symposium." Proceedings of the 44th Annual Meeting, North Dakota State University, Fargo, ND, 233 p.

DATABASES & COMPUTER SYSTEMS Total Funding To Date --- \$ 320,709

- Coulson, J.R. and J. Mowder. 1992-1994. Operation of the Solbourne computer system, GRIN Database. USDA, ARS\GRIN, Beltsville, MD.
- Coulson, J.R. 1994. Support for the National Biological Control Information Center Technical Information Specialist. USDA, ARS\Biological Control Documentation Center, Beltsville, MD.
- Coulson, J.R. 1995-1996. Reprogramming of the ROBO (Release of Beneficial Organisms) Database. USDA, ARS\Biological Control Documentation Center, Beltsville, MD.
- Flint, M.L. 1998. Interactive, computer-assisted training in biological control for retail nursery clerks. University of California at Oakland, Oakland, CA.
- Frank, J.H. and J. Lombardi. 1993-1994. "Economics of Use of Biological Control. A Biological Control Database for the Southern United States." University of Florida, Gainesville, FL. and "Quantification of Risk for Integrated Pest Management as a Decision-Making Aid for Farmers with Applications to Turfgrass in the Southeast." M.Sc. Thesis, University of Florida, Gainesville, FL, 54 p.
- Hagler, J.R., S.L. Buchmann and G. DeGrandi-Hoffman. 1995. A World Wide Web (Internet) Server for Biological Control: BC:WEB. USDA, ARS.
- Kim, K.C. 1994. "North American Immigrant Insects and Arachnids: Pathways and Impacts." Pennsylvania State University, University Park, PA.

- Markin, G.R. 1997. Database of weed biological control agents released on national forest land. USDA, Forest Service, Intermountain Research Station, Ogden, UT.
- Onstad, D. 1993-1996. "Computerized Database of the World's Insect Pathogens." Illinois Natural History Survey, Champaign, IL.
- Poole, R. 1994. "*Braconidae* - in BIOTA, A Biosystematic Checklist of the Insects of the World." USDA, ARS\SEL, Washington, DC.
- Shelton, A.M. and M.P. Hoffmann. 1995. Text and Graphic Server for Dissemination of Information on Biological Control. Cornell University, Ithaca, NY.



DATABASES & COMPUTER SYSTEMS: (continued)

- Williams, D. 1990-1991. Documentation and exchange of information on biological control. USDA, ARS, Greenbelt, MD.
- Woolley, J. 1996. "Database for World Species of *Encarsia* (Hymenoptera: Aphelinidae)." Texas A&M University, Texas Agricultural Experiment Station, College Station, TX.
- Zalom, F. and J. Strand. 1994-1995. "Alternatives to Pesticides Database." University of California, Davis, CA.

INTERNATIONAL PROGRAMS Total Funding To Date --- \$ 187,650

- Bennett, F.D. and R. Baranowski. 1991. Foreign exploration for natural enemies of *Thrips palmi*. University of Florida, Gainesville, FL.
- Browning, H., G.A. Evans, Y. Tang, J. Xa. 1998-1999. Importation of Natural Enemies of the Brown Citrus Aphid, *Toxoptera citrida*, (Homoptera: Aphididae) from China.
- DeLoach, J., S. Myartseva, and I. Metyaev. 1998. Overseas testing of insects for biological control of Saltcedar (*Tamarix*). USDA, ARS, Temple, TX.
- Dysart, R. 1991. Exploration for grasshopper egg parasites in Australia. USDA, ARS, Boise, ID.
- Fornasari, L. 1990. Foreign exploration of natural enemies of leafy spurge and saltcedar. USDA, ARS\European Biological Control Laboratory, Rome, Italy.
- Gingrick, R. 1991. Development of *Bacillus thuringiensis* for controlling adult Mediterranean fruit flies. International Atomic Energy Agency, Vienna, Austria.
- Halbert, S. 1990. Foreign exploration for natural enemies of the Russian wheat aphid in China. University of Idaho, Moscow, ID.
- Hoy, M., R. Nguyen, L. Osborne, and D. Meyerdirk. 1998. Classical Biological Control of the Pink Hibiscus Mealybug. University of Florida, Gainesville, FL.
- Kirk, A.A., J.A. Goolsby, M.E. Schauff, and M. Hoy. 1999. Evaluation of the natural enemies of *Maconellicoccus hirsutus* (Pink Hibiscus Mealybug) in Australia for use in biocontrol in the USA. USAD, ARS, EBCL, Montpellier, France.
- Meyerdirk, D.M. 1991. Exploration for biological control agents of Colorado potato beetle. USDA, APHIS\PPQ, Hyattsville, MD.
- Nechols, J.E. 1993. IOBC support for Dr. V.C. Moran to review NBCI's international activities. Kansas State University, Manhattan, KS.
- Obyrcki, J.J. 1992. International Organization for Biological Control support for Dr. D. Girling, NBCI Visiting Scientist (*Bemisia* project). Iowa State University, Ames, IA.
- Obyrcki, J.J. 1992. International Organization for Biological Control support for Dr. V.C. Moran, NBCI Visiting Scientist (review of NBCI's international activities). Iowa State University, Ames, IA.
- Sivinski, J., R. Messing, W. Wharton, and W. Overholt. 1999. Collection and colonization of *Fopius* sp (Hymenoptera: Brachonidae), a newly discovered parasitoid of the Mediterranean fruit fly. USDA, ARS, Gainesville, FL.



REGULATORY ISSUES
Total Funding To Date --- \$ 9,922

Browning, H. 1991. "Critical Issues in Biological Control Symposium",
10-12 June 1991, Vienna, VA. University of Florida, Institute of Food
and Agricultural Sciences, Lake Alfred, FL.
Fugere, C. 1996. Biological Control of Weeds Regulatory Summit:
"How to Make Regulations that Work for Biological Control
Programs." North Dakota Department of Agriculture.



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